

# Potential Damage to Ukrainian Cultural Heritage Sites

Report Coverage: 24 February 2022 to 31 January 2023



CULTURAL  
HERITAGE  
MONITORING LAB

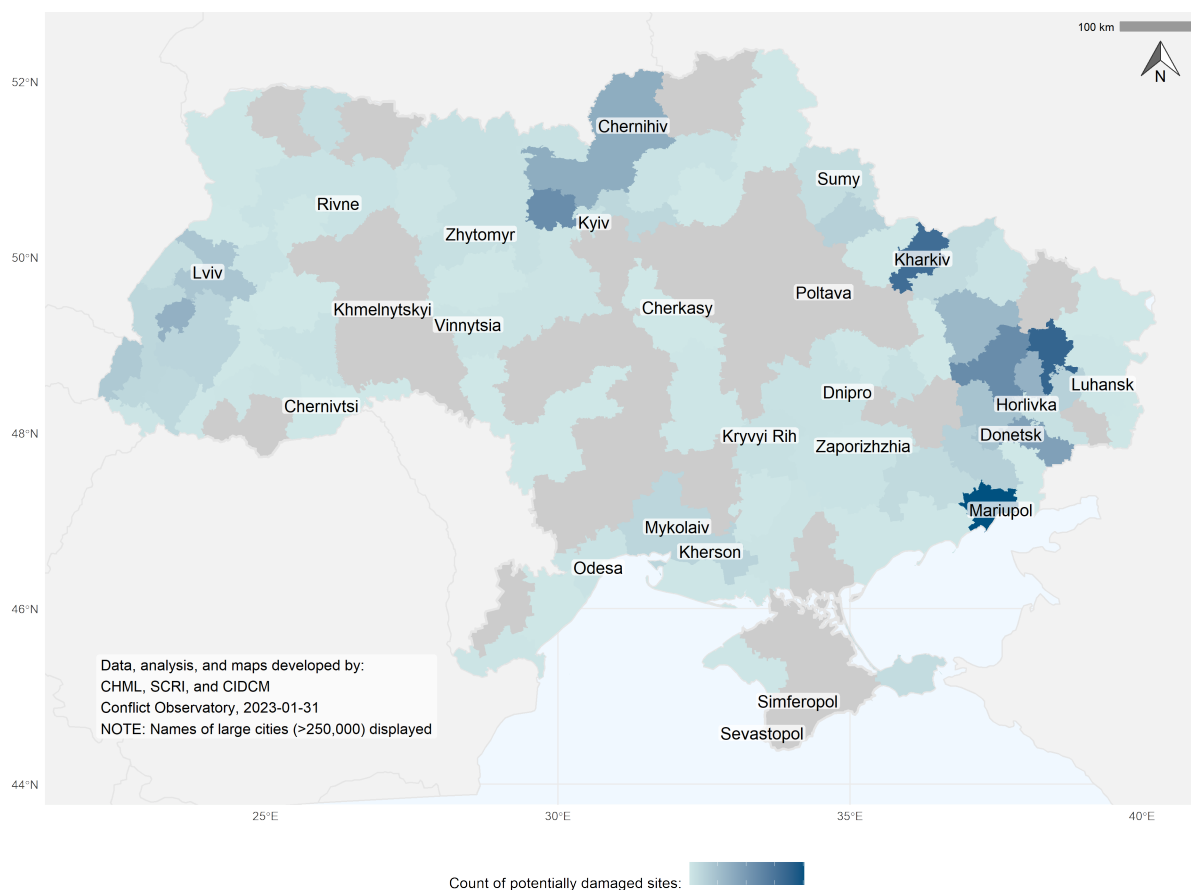


Smithsonian  
Cultural Rescue Initiative



CIDCM  
CENTER FOR INTERNATIONAL  
DEVELOPMENT & CONFLICT MANAGEMENT

**Executive Summary:** This report describes the potential damage to cultural heritage sites in Ukraine that occurred between 24 February 2022 and 31 January 2023.<sup>1</sup> In total, potential damage to 1,595 out of 28,618 cultural heritage sites has been identified. This report uses the up-to-date version of the NASA Fire Information for Resource Management System (FIRMS) data going back to 24 February 2022. Revisions to the near real-time satellite data resulted in changes to the number of sites with potential damage from prior reports. This report identifies four new potential impacts for the period between 31 December 2022 and 31 January 2023. Overall, damage has occurred primarily in the raions of Mariupolskyi, Sievierodonetskyi, Kharkivskyi, Kramatorskyi, and Buchanskyi. The cultural heritage site types most likely to be damaged during the conflict so far include Memorial/Monument and Place of Worship & Burial.



<sup>1</sup>See for previous report: Bassett, H. F., Aronson, J., Cil, D., Hanson, K., Meharry, J. E., Narimanova, N., Averyt, K., Carroll, C., Harrell, K., Fitzgerald, K., Maher, A., Mints, E., Welsh, W., Wegener, C., and Daniels, B. I. (2023). Potential Damage to Ukrainian Cultural Heritage Sites, 24 February 2022 and 31 December 2022. Virginia Museum of Natural History, Cultural Heritage Monitoring Lab; University of Maryland, Center for International Development and Conflict Management; and Smithsonian Institution, Smithsonian Cultural Rescue Initiative. Available at: <https://hub.conflictobservatory.org/portal/apps/sites/#/home/pages/heritage-1>.

**Background:** Cultural heritage in conflict is primarily protected by international law under the 1954 Hague Convention, which was adopted in response to the cultural destruction witnessed during World War II. The Convention, to which Russia and Ukraine are member states, obligates State Parties to “respect” and “safeguard” cultural property in the event of armed conflict. Following Russia’s invasion of Ukraine on 24 February 2022, the international community rapidly responded to the urgent threat to Ukraine’s cultural heritage. Since the invasion, the Virginia Museum of Natural History’s Cultural Heritage Monitoring Lab (CHML) and the Smithsonian Institution’s Smithsonian Cultural Rescue Initiative (SCRI) have been monitoring 28,618 cultural heritage sites in Ukraine.<sup>2</sup> Damage and looting to Ukrainian cultural heritage sites may represent criminal acts, violate the 1954 Hague Convention, and be potential war crimes or crimes against humanity.

**Findings:** A total of 1,595 potentially damaged cultural heritage sites were identified across Ukraine between 24 February 2022 and 31 January 2023, which represents approximately 5.6% of the sites monitored by CHML, SCRI, and the University of Maryland’s Center for International Development and Conflict Management (CIDCM). Based on analysis, the highest number of sites with potential damage (38.7% total) were in the raions of Mariupol’skyi, Sievierodonetskyi, Kharkivskyi, Kramatorskyi, and Buchanskyi (see map). Memorial/Monument (43.3%) and Place of Worship & Burial (31.8%) were the most common types of sites sustaining potential damage across the country (see table).

Heritage Type	Count	Portion
Memorial/Monument	691	43.3%
Place of Worship & Burial	508	31.8%
Museum	126	7.9%
Library/Archive	109	6.8%
Heritage Building	100	6.3%
Undetermined	33	2.1%
Archaeological Site	18	1.1%
Performance Center	10	0.6%

**Methodology:** This analysis identifies potential damage to cultural heritage sites in Ukraine based on their proximity to non-agricultural fires visible on satellite data and social media posts. To create a list of cultural heritage sites that are potentially damaged, we use remote sensing technologies and a list of 28,618 cultural heritage sites in Ukraine.<sup>3</sup> For this report, the term cultural heritage site includes archaeological sites, archives, arts centers, libraries, memorials, monuments, museums, and places of worship and burial. Conflict-related damage to cultural heritage sites ranges from complete destruction to partial damage from events such as fire, looting, and observable or unobservable structural degradation. This monitoring effort uses cultural heritage inventory data developed by CHML, SCRI, and CIDCM under the Cultural Heritage Site List (CHSL) data standards established by the Penn Cultural Heritage Center (PennCHC) at the University of Pennsylvania Museum.<sup>4</sup>

Potential damage to cultural heritage sites is identified using multi-spectral satellite data and

<sup>2</sup>Bassett, H. F., Koropecyk, D. V., Averyt, K., Hanson, K., Wegener, C., and Daniels, B. I. (2022). Ukrainian Cultural Heritage Potential Impact Summary (6 April 2022). Virginia Museum of Natural History, Cultural Heritage Monitoring Lab; and Smithsonian Institution, Smithsonian Cultural Rescue Initiative.

<sup>3</sup>This number includes the ruins feature type from the OSM data. Potential damage to ruins is being monitored but excluded from the total number of potentially damaged sites because this category includes both historic and contemporary ruins.

<sup>4</sup>See Daniels, B. I., and Golden, G. (2018). Conflict Culture Research Network: Cultural Heritage Site List Dataset, Codebook 3.0. University of Pennsylvania Museum, Penn Cultural Heritage Center. This data collection effort was supported by National Science Foundation Grant #1439549.

credible social media sources. A potentially damaged site is one that has a moderate to high probability of having sustained conflict-related damage based on social media reporting or proximity to non-agricultural fires. A site is categorized as potentially damaged when it is proximate to an infrared signature identified through NASA FIRMS data that does not overlap with burned agricultural land.<sup>5</sup> Infrared signatures detected by satellite that do not overlap locations where agricultural burning may be present are likely indicative of conflict activity (e.g., artillery barrages, airstrikes, or sustained direct fire). Proximity between cultural heritage sites and infrared signatures recorded in FIRMS data is based on the resolution of the sensor: 1,000m for MODIS<sup>6</sup> and 375m for VIIRS.<sup>7</sup> Agricultural lands are identified based on MODIS Terra and Aqua Land Cover Type data.<sup>8</sup> Heat signatures detected in agricultural areas are excluded from the analysis of conflict-related potential damage to cultural heritage sites. Sites are considered “potentially damaged” until damage is confirmed or a ground assessment indicates that a property has not sustained damage. CHML, SCRI, and CIDCM teams continue to use high-resolution satellite imagery and open-source research to monitor and confirm ongoing damage to Ukrainian cultural heritage sites. As of 31 January 2023, analysis of high-resolution satellite imagery and open-source research have confirmed damage to 309 of the 1,595 cultural heritage sites with potential damage.<sup>9</sup>

---

This report was produced for the Conflict Observatory by the Cultural Heritage Monitoring Lab (CHML) at the Virginia Museum of Natural History (VMNH), the Smithsonian Cultural Rescue Initiative (SCRI) at the Smithsonian Institution, and the Center for International Development and Conflict Management (CIDCM) at the University of Maryland. Support was provided by the Bureau of Conflict and Stabilization Operations, United States Department of State. Views expressed in this report represent those of the authors alone and do not necessarily reflect the views of the United States Government.

Learn more at <https://conflictobservatory.org>. Visit <https://www.vmnh.net/research-collections/chml> for information on CHML, <https://culturalrescue.si.edu/> for information on SCRI, <https://cidcm.umd.edu> for information on CIDCM, and <https://www.penn.museum/sites/chc/> for information on PennCHC.

**Cite this report:** Bassett, H. F., Aronson, J., Cil, D., Hanson, K., Meharry, J. E., Narimanova, N., Averyt, K., Carroll, C., Harrell, K., Fitzgerald, K., Maher, A., Mints, E., Welsh, W., Wegener, C., and Daniels, B. I. (2023). Potential Damage to Ukrainian Cultural Heritage Sites, 24 February 2022 to 31 January 2023. Virginia Museum of Natural History, Cultural Heritage Monitoring Lab; University of Maryland, Center for International Development and Conflict Management; and Smithsonian Institution, Smithsonian Cultural Rescue Initiative.

<sup>5</sup>Koropeckyj, D., Bassett, H., Harrell, K., Welsh, W., and Gunter-Bassett, M. (2022). Impacts to Cultural Heritage in Ukraine. Tearline. Available at: [https://www.tearline.mil/public\\_page/impacts-to-cultural-heritage-in-ukraine](https://www.tearline.mil/public_page/impacts-to-cultural-heritage-in-ukraine).

<sup>6</sup>MODIS Collection 61 NRT Hotspot / Active Fire Detections MCD14DL distributed from NASA FIRMS. Available at: <https://earthdata.nasa.gov/firms>.

<sup>7</sup>NRT VIIRS 375 m Active Fire product VJ114IMGTDL\_NRT distributed from NASA FIRMS. Available at: <https://earthdata.nasa.gov/firms>; NRT VIIRS 375 m Active Fire product VNP14IMGD distributed from NASA FIRMS. Available online <https://earthdata.nasa.gov/firms>.

<sup>8</sup>Friedl, M., and Sulla-Menashe, D. (2019). MCD12Q1 MODIS/Terra+Aqua Land Cover Type Yearly L3 Global 500m SIN Grid V006, distributed by NASA EOSDIS Land Processes DAAC, accessed 2022-08-26.

<sup>9</sup>Harrell, K., Koropeckyj, D., Fitzgerald, K., Maher, A., Mints, E., Gunter-Bassett, M., Welsh, W., and Bassett, H. (2023). Impacts to Cultural Heritage in Ukraine, 1 September 2022 through 31 January 2023. Tearline. Available at: [https://www.tearline.mil/public\\_page/impacts-to-cultural-heritage-in-ukraine-01-september-2022-through-31-january-2023/](https://www.tearline.mil/public_page/impacts-to-cultural-heritage-in-ukraine-01-september-2022-through-31-january-2023/).